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**A NEW FLYING SQUIRREL FROM THE SOUTHERN  
APPALACHIAN MOUNTAINS**

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The spruce and balsam forests of the Southern Appalachian Highlands are the haunt of a boreal flying squirrel of the species *Glaucomys sabrinus* which is subspecifically distinct from more northern populations. It may be known as:

***Glaucomys sabrinus coloratus*, new subspecies**

*Type*.—Young adult female; skin and skull; U. S. National Museum No. 292278; collected 1 March 1951 by Malcolm G. Edwards at 5000 feet elevation on Bald Knob, three and one-half miles south of the summit of Mount Mitchell, Yancey County, North Carolina.

*Distribution*.—Irregularly distributed at high elevations in the spruce and balsam cloud forests of the southern Appalachian Mountains, in North Carolina, Tennessee, and possibly Virginia. It is thus far known definitely only from Blanket Mountain in the Great Smoky Mountains National Park, Sevier County, Tennessee; from Roan Mountain, Carter County, Tennessee; and from Mount Mitchell, Yancey County, North Carolina; at elevations of 4000, 5500, and 5000 feet, respectively. It probably also occurs on some of the other moist spruce and fir "islands" of this general area. Zonal range: Canadian.

*Description*.—Adult coloration (capitalized color terms are from Ridgway, 1912, *Color standards and color nomenclature*): Specimens collected in August similar to *G. s. fuscus*, but darker both above and below; dorsum between Cinnamon-Brown and Mikado Brown; entire under surface of body, legs, and flight membranes with wash ranging from Pale Yellow-Orange to Ochraceous-Buff, leaving few or no white-tipped hairs; under surface of tail suffused with orange (between Cinnamon and Ochraceous-Buff) and edged with sooty at tip and along margins of distal half; soles of hind feet brownish; upper surface of tail between Brussels Brown and Prout's Brown, with sooty suffusion, especially at tip; upper surfaces of feet between Warm Sepia and Bone Brown; ears dark; sides of face and cheeks gray, washed with buff. Specimens collected in February and March, paler throughout; dorsum between Cinnamon-Brown and Sayal Brown; under surface of tail between Light Ochraceous-Salmon and Light Ochraceous-Buff. Immature coloration (August and September): Like *G. s. fuscus*, but darker throughout.

Body size about as in other southeastern races, but tail longer. Skull long and relatively narrow; rostrum long and broad; supraorbital process wide at base; braincase long; palate long and wide; maxillary tooth row long.

*Measurements*.—See Table I.

*Comparisons*.—Available specimens demonstrate a north-south color cline in the Appalachians, with the pale *macrotis* in the north, the dark

TABLE I  
 AVERAGE AND EXTREME MEASUREMENTS IN MILLIMETERS OF FLYING SQUIRRELS,  
*Glaucomys sabrinus*, FROM EASTERN UNITED STATES

	Total length	Tail vertebrae	Hind foot	Bar, from notch	Greatest length of skull	Zygomatic breadth	Interorbital breadth	Median length of nasals	Maximum anterior breadth of combined nasals	Width of supraorbital process, at base	Length of braincase (1)	Mastoidal breadth	Alveolar length of maxillary tooth row	Length of palate (2)	Width of palate (3)
<i>G. s. coloratus</i> 7 males and females, including type, from North Carolina and Tennessee	Ave.	134	39	24	38.1	22.3	6.8	10.8	5.3	3.2	18.0	17.2	7.4	12.6	9.3
	Min.	127	35	20	37.1	21.6	6.5	10.5	5.1	2.9	17.6	16.8	7.1	12.3	9.0
	Max.	142	40	30	39.0	23.9	7.1	11.0	5.9	3.6	18.6	17.8	7.5	13.0	9.7
<i>G. s. fuscus</i> 5 males and females, including type, from West Virginia	Ave.	115	37	26	36.8	22.2	6.7	10.3	5.2	2.9	17.7	16.9	7.1	12.2	9.0
	Min.	108	35	25	36.2	21.6	6.5	10.0	4.9	2.6	17.3	16.7	6.9	11.9	8.9
	Max.	127	39	27	37.1	22.6	7.0	10.7	5.4	3.1	18.0	17.2	7.4	12.8	9.1
<i>G. s. macrotis</i> 4 males and females, including type, from New York	Ave.	121	37	24	37.2	22.7	7.1	10.6	5.2	3.0	18.0	16.9	7.1	12.2	9.1
	Min.	117	36	24	36.8	22.5	7.0	10.4	5.1	2.5	17.6	16.7	6.8	12.1	8.9
	Max.	125	38	24	37.6	23.0	7.2	10.8	5.6	3.4	18.3	17.0	7.4	12.3	9.2

(1) From median anterior edge of parietals to median dorsal border of foramen magnum.

(2) From palatal border of posterior nares to posterior border of incisive foramina.

(3) To outer margins of molar crowns.

*coloratus* in the south, and *fuscus* occupying middle ground both geographically and in color.

Specimens of *macrotis* from New York, compared with specimens of *fuscus* and *coloratus*, are lighter-backed and more cinnamon, and have the tail lighter on both surfaces and largely lacking the sooty tip and margins characteristic of the southern races. The dorsal surfaces of the feet are considerably lighter, the sides of the face and cheeks are less gray, the dark lateral margins of the flight membranes are less blackish, the ears are lighter, and the underparts are whiter and less washed with orange and buff.

*G. s. fuscus* resembles *G. s. coloratus* except that the back and cheeks are slightly lighter, the under surface of the tail is not so bright, and the underparts are less extensively washed with orange and buff.

The color differences between *macrotis* and *coloratus* are striking in winter as well as in summer pelage. Though both races are paler in winter, the distinctions already outlined still apply, with the possible exception of the orange and buff wash on the underparts, which appears to be irregular at that season. No winter-caught specimens of *fuscus* have been studied.

Immature specimens collected from August to October exhibit a similar north-south color cline, but in this pelage *fuscus* appears to be more nearly intermediate, differing more radically from *coloratus* than in the adult stage. Immature specimens of *coloratus* are darker in all details, including the tail, feet, cheeks, ears, and underparts. The tail is dusky over the entire dorsal surface and on the margin and tip ventrally; this dusky color is shown much less by *fuscus* and not at all by *macrotis*.

Compared with *G. s. fuscus*, *G. s. coloratus* has a longer tail, a longer skull, broader supraorbital processes, longer maxillary tooth rows, longer braincase, longer and wider palate, and longer nasals that are more expanded distally. *G. s. macrotis* closely resembles *fuscus* in cranial characters, except that the nasals are long as in *coloratus*. No clinal relationship has been determined in external or cranial proportions among the southeastern races.

*Remarks.*—The specimens from Mount Mitchell were taken in a dense forest of virgin spruce and fir and in mature yellow birch trees on the fringe of the conifers. The Roan Mountain specimen came from a yellow birch forest on a north slope several hundred feet below the conifer zone. The Blanket Mountain locality is in the Appalachian deciduous forest, at least seven airline miles from the nearest spruce and fir. All the squirrels were caught in rat traps nailed to the trunks of large trees. The traps on Mount Mitchell were baited with a mixture of peanut butter, prunes, and rolled oats. From its nearest relative, *Glaucomys sabrinus fuscus* of the spruce-birch-beech-maple zone of eastern West Virginia, *G. s. coloratus* is ecologically isolated by a wide area of probably inhospitable dry oak-hickory forest.

A subadult specimen of *coloratus* (U.S.N.M. No. 292277) trapped at the type locality on January 31 is a genetic aberration. The brown pigment is much diluted throughout, so that the dorsum is between Wood Brown and Drab and the tail and feet are almost clear sooty gray. Four other specimens trapped nearby are normal in appearance. No similar specimens of *Glaucomys* have been found in the collections of the University of Michigan or the U. S. National Museum.

*Specimens examined.*—Specimens are in the U. S. National Museum (including the Biological Surveys Collection), except as indicated by the following abbreviations: GSMNP, National Park Service, Great Smoky Mountains National Park; UMMZ, University of Michigan Museum of Zoology; WVMS, West Virginia Mammal Survey, West Virginia Conservation Commission. I am grateful to the authorities of these organizations for the loan of specimens, and also to those of the North Carolina Conservation Commission for assistance in securing specimens in the field. *G. s. coloratus.*—NORTH CAROLINA: Yancey Co., Mt. Mitchell, 5000 ft., 5 (3 in UMMZ). TENNESSEE: Carter Co., Roan Mt., 5500 ft., 1. Sevier Co., Blanket Mt., 4000 ft., 1 (GSMNP). *G. s. fuscus.*—WEST VIRGINIA: Pocahontas Co., Cranberry Glades, 3300 ft., 1 (the type); Mill Point, Cranberry River, 3450 ft., 1 (WVMS). Randolph Co., Bickle Knob, 7.9 mi. NE Elkins, 3900 ft., 1 (WVMS); Cheat Bridge, 3900-4000 ft., 2. *G. s. macrotis.*—MASSACHUSETTS: Middlesex Co., Wilmington, 1. Worcester Co., Lunenburg, 1; Winchendon, 1. NEW HAMPSHIRE: Carroll Co., Ossipee, 4. NEW YORK: Adirondaek Mts., 1. Greene Co., Hunter Mt., 1 (the type). Herkimer Co., Big Moose Lake, 1; Locust Grove, 1. Madison Co., Peterboro, 1.